

Femoral Pseudoaneurysm in IV Drug Abusers: Single-center Study Experience

Kajan Raj Shrestha,¹ Dinesh Gurung,¹ Nischal Khanal,¹ Uttam Krishna Shrestha¹

¹Department of Cardiothoracic and vascular surgery, Manmohan Cardiothoracic Vascular and Transplant Center, Institute of Medicine, Maharajgunj, Kathmandu, Nepal.

ABSTRACT

Background: Pseudoaneurysm of the femoral artery is the most common complication among IV drug abusers who inject drugs in groin. These are usually infective and potentially fatal so it requires astute clinical recognition and prompt treatment, possessing a significant challenge to vascular surgeons.

Methods: We present a retrospective descriptive study and the prevalent practice of their management covering the period from 2013 July- December 2019 at our center. Data regarding demography, presentation, surgical management, and the outcome was analyzed.

Results: Among 368 femoral pseudoaneurysm operated during the period, groin swelling with pulsatile mass was the most frequent presentation accounting 304 (82.61%) patients. About 67.12% (247 patients) of the pseudoaneurysm has purulent discharge and 60.07% (221 patients) had bleeding at presentation out of which 211 patients had hepatitis C (HCV), hepatitis B (HBsAg) and/or Human Immunodeficiency virus (HIV) status positive. Thirty six patients (9.78%) presented with femoral pseudoaneurysm in both groins. Ligation and excision of the pseudoaneurysm were done in all cases while delayed revascularization was done in eight patients with expanded Polytetrafluoroethylene (ePTFE) graft in one patient and venous bypass grafts in other 7 cases. All patients after bypass had no major limb loss and two patients had a patent graft at five years follow up. There were nine mortalities and thirty two patients underwent amputation.

Conclusions: Infected femoral pseudoaneurysm can be managed by ligation of the involved artery with delayed revascularization if required without major limb and life loss.

Keywords: Delayed revascularization; drug abuser; infected pseudoaneurysm; ligation

INTRODUCTION

Intravenous Drug abuse (IVDU) is a major global socio-medical concern.^{1,2} There is an alarming numerical surge of drug addicts, especially those injecting drugs, and those in whom related vascular complications are encountered. A femoral pseudoaneurysm, a pulsating, encapsulated hematoma in communication with the lumen of a ruptured artery is one of the commonest complication.² The optimum management of infected femoral pseudoaneurysm still remains controversial as there are no guidelines published till date.³⁻⁵

Arterial ligation, with extensive debridement of all necrotic tissue, followed with revascularization was initially the treatment of choice. However, the role and method of revascularization have often been questioned.⁶⁻⁸ Recent works of literature have advocated

ligation and debridement alone, with or without interval revascularization as the ideal management.¹ Previous or current deep venous thrombosis, positive viral infection status and recurrent drug abuse further complicates the management amongst this population groups.^{9,10}

We report our familiarity of femoral pseudoaneurysm in an IVDU population and outcome in patients who underwent arterial ligation alone with and without revascularization.

METHODS

This is a retrospective chart review of prospectively kept records, performed of all IVDU patients diagnosed with a femoral pseudoaneurysm at the Manmohan Cardiovascular Thoracic and Transplant Center (MVCVTC) over a period of 6.5 years, from July 2013 to December

Correspondence: Dr Kajan Raj Shrestha, Department of Cardiothoracic and vascular surgery, Manmohan Cardiothoracic Vascular and Transplant Center, Institute of Medicine, Maharajgunj, Kathmandu, Nepal, Email: kajanrs@gmail.com, Phone: +9779849150450.

2019.

A similar medical protocol was charted for the entire patient. Following a suspicious clinical presentation, all patients were subjected to Doppler ultrasonogram of the affected limb except a patient who was massively bleeding at presentation and had to be rushed to the operating room. Those patients having doubtful Doppler results were subjected for lower limb Computerized Tomogram (CT) angiogram. All of the patients underwent ligation of the external iliac, common femoral, superficial femoral and profunda femoris arteries, followed by excision and debridement of the wound. All patients were operated by one of the three surgeons, post master's degree having experience of more than 50 cases of vascular surgery independently. Except for cases that were presented with ongoing bleeding, rest of the cases were planned on routine day list basis after confirmation of the diagnosis. Intravenous ceftriaxone 2gm and amikacin 500mg were given preoperatively and continued postoperatively until any signs of infections persisted. Subsequently, dressings of the wound were done in the ward and patients were monitored for the signs of limb ischemia. Patients were discharged as soon as they were clinically stable and ambulatory. Patient demographics, presenting symptoms, and investigation results were noted. The therapeutic intervention used, complications encountered and patient outcome was analyzed. Follow-up in terms of morbidity, mortality, limb salvage, and further intervention was recorded.

Categorical data was statistically represented as mean and standard deviation using Excel 10 in this study. No major statistical analysis was done.

RESULTS

In the period of the study, total three hundred thirty two IV Drug abusers presented with three hundred and sixty eight femoral pseudoaneurysm. Of all the patient, 276 patients were male while 92 patients were female. The mean age of patients was 27.8 ± 3.88 years (range 16-45 years).

Table 1. Age and gender distribution.

Age (yrs) and gender	10 -20	20 -30	30 -40	>40	Total
Male	52	142	56	26	276
Female	13	49	30	0	92

The mean duration of IV drug abuse was 27.3 ± 11.2 months. Twenty six (7.83%) percent patients were only abusing a single drug while rest (332 abusers; 92.17%)

were using more than one kind of drug. Students were most vulnerable to IV drug abuse. (n=164, 49.4%) (Figure 1)

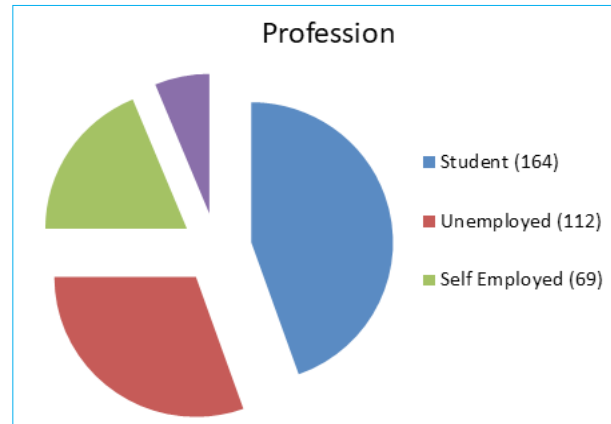


Figure 1. Profession distribution of IVDU.

Right common femoral artery was the mostly involved site (n= 202; 69%) followed by left common femoral (n= 91; 31%). Self-Injection was the commonest mode of injection [n=349]. Three hundred and six patients had hepatitis C virus (HCV) positive, one hundred ninety nine patients had hepatitis B surface antigen (HBsAg) positive and sixty-eight patients had human immunodeficiency virus (HIV) positive.

Concurrent multiple serology was positive in two hundred and eleven patients. Table 2 summarizes the history, physical findings, and chief presenting features of the 332 patients who were included in this study.

Table 2. Clinical presentation of pseudoaneurysm.

Findings	No. of Patients	Percentage
History of pulsatile mass	304	82.61
Swelling in the groin	294	79.89
Pain and tenderness	260	70.65
Purulent discharge	247	67.12
Bleeding on and off	221	60.07
Limb oedema	200	54.35
Fever with chills and rigor	84	22.83
Ruptured	98	26.63
Misdiagnosed ad abscess undergoing incision and drainage	22	5.98
Ischaemic/ gangrenous changes	6	1.63

Ninety eight patients presented with life-threatening hemorrhage while pulsating mass was predominant

presenting feature (82.61%). Twenty-two (5.98%) patients underwent incision and drainage following misdiagnosis at another center.

All patients were treated surgically, through ligation of common femoral vessel and its branches along with debridement of dead and necrotic tissue. Supra-inguinal incision parallel to the inguinal ligament was made in all subjects control external iliac artery proximally. The pseudoaneurysm was then exposed to a vertical incision in infra inguinal area. The groin wound in all patients with infection was packed and left open to heal by secondary intention while in others wound was closed after thorough debridement. None of the patients underwent primary repair. The lower limb was monitored for symptoms of acute ischemia including coldness, sensory and motor impairment, as well as any changes in colour and capillary refilling for atleast 48 hrs.

Revascularization was the procedure of choice if progressive ischemia of the limb developed; it was performed through extra-anatomical (obturator or iliofemoral) route using prosthetic vascular graft in one patient and reverse saphenous venous autograft in 7 patients. Of the eight patients who underwent revascularization, one patient had to undergo transmetatarsal amputation due to distal ischemia. The remaining patients had a favorable outcome, as six patients had patent vessels at 6 months follow-up and only 2 had patent graft at 5 years.

Thirty two affected lower limbs required amputation after ligation and excision of the pseudoaneurysm [Table 3]. Of these 32 patients, 9 died due to sepsis, hypovolemia and multi organ failure, thus accounting for 2.71% mortality rate and 9.64% amputation rates at our center.

Table 3. Outcome after ligation.

Outcome	No. of Patients	Percentage
Neurological pain	250	67.93
Venous insufficiency	207	56.25
Mild claudication	143	38.86
Rebleeding	11	3.00
Recurrence	4	1.09
Severe claudication requiring revascularization	8	2.17

Follow up data were available in 139 patients only upto 5 years. The mean follow up duration was 13 months, with a range of 3 months to 5 years. Patients with mild claudication post-operatively were medically treated

and had persistence of minimal clinical symptoms.

DISCUSSION

The number of intravenous drug abuser is gradually increasing in recent year, thus imposing numerous socio-medical problems.^{2,3} Pseudoaneurysm is common complication affecting IV drug abusers and femoral artery is the commonest artery affected.^{4,5,13} Introduction of infected septic material by non-sterile techniques associated with arterial trauma is the root cause behind the development of this pseudoaneurysm. This condition can lead to systemic sepsis, limb loss, life-threatening hemorrhage, and even death if not treated in time.⁶

Because of various socio-economic reasons, patients usually present late with complications such as torrential bleeding, sepsis and limb ischemia. It is for this reason infected femoral artery pseudoaneurysm is difficult to treat and their optimal management is still a matter of debate amongst vascular surgeon. An IVDU presenting with pain, swelling and bleeding in the groin should prompt a high index of suspicion for pseudoaneurysm formation, and all should have Doppler ultrasonography performed. This is the diagnostic modality of choice.^{7,9,10} It provides a dynamic view, allowing for the detection of arterial defect and estimation of the size of the neck which helps to subject the patients for surgical procedures or percutaneous intervention.¹¹

Although being such a common entity, there has been no common consensus for the management of these infected pseudoaneurysm amongst vascular surgeons.¹¹⁻¹⁴ There are numerous management principles, however, a growing number of clinicians and literature advocate minimal intervention that maintains limb viability even in the presence of claudication.^{12,15,16} Our management principle was based on simultaneous ligation of common femoral artery and its branches, debridement, followed by selective (delayed) arterial revascularization. Immediate revascularization was not sought as the optimal procedure of choice as most patients had severe swelling and fibrosis around the injection site, or even the whole affected limb. The venous conduits of intravenous drug abusers are almost always in a poor state due to thrombophlebitis from previous injections and are seldom appropriate for use as bypass grafts and in these patients use of synthetic material carries a significant risk of graft infection. Above all drug addicts usually face financial constraints, and the high cost of artificial vessels is a problem in Nepal.

Infection and limb loss have been reported as high as 32.5% and 11.3% respectively following routine

revascularization by Georgiadis et al.⁶ His study also reported observation-selective revascularization in limbs that apparently were in danger if critical ischemia yields approximately the same amputation rates (12.6%). In this study, we found the amputation rate was 8.7% amongst the entire patient.

Additionally, these groups of the patient often harbor infectious diseases such as hepatitis B, AIDS and syphilis. A similar series conducted at the very same institute 7 years ago reported 45% seropositive cases amongst similar population group.⁷ In our series, the figures were 83.15% (306/368), 54.08 % (199/368), 18.48 % (68/368) and 57.34% (211/368) for hepatitis C, hepatitis B, HIV and multiple seropositive respectively. These figures showcase an alarming increase of infectious disease necessitating utmost precautionary handling within these population groups.

CONCLUSIONS

In our series, simple ligation and debridement of the infected femoral pseudoaneurysm was the most frequent management method for treating infected femoral pseudoaneurysm. Simple ligation of femoral artery seems to be a safe procedure in drug abusers presenting with infected femoral pseudoaneurysm and medical staffs should take strict precautions and protection measures owing to the fact that these are vulnerable group.

CONFLICT OF INTEREST

None

REFERENCES

1. Naqi SA, Khan HM, Akhtar S, Shah TA. Femoral pseudoaneurysm in drug addicts--excision without revascularization is a viable option. *Eur J Vasc Endovasc Surg*. 2006;31(6):585-7. DOI <http://dx.doi.org/10.1016/j.ejvs.2005.12.011>
2. World Drug Report. 2015; World Drug Report [Internet]. United Nations Office on Drug and Crime (UNODC) (United Nations Publication sales No. E.15 XI.6). 2015 Dec 16; DOI <http://dx.doi.org/10.18356/b07f5d3f-en> [FullText]
3. Arora S, Weber MA, Fox CJ, Neville R, Lidor A, Sidawy AN. Common femoral artery ligation and local debridement: a safe treatment for infected femoral artery pseudoaneurysms. *J Vasc Surg*. 2001;33(5):990-3. DOI <http://dx.doi.org/10.1067/mva.2001.114212>
4. Tan KK, Chen K, Chia KH, Lee CW, Nalachandran S. Surgical management of infected pseudoaneurysms in intravenous drug abusers: single institution experience and a proposed algorithm. *World J Surg*. 2009;33(9):1830-5. DOI <http://dx.doi.org/10.1007/s00268-009-0123-2>
5. Chan YC, Burnand KG. Management of septic groin complications and infected femoral false aneurysms in intravenous drug abusers. *BJS*. 2006;93(7):781-2. DOI <http://dx.doi.org/10.1002/bjs.5452>
6. Georgiadis GS, Lazarides MK, Polychronidis A, Simopoulos C. Surgical treatment of femoral artery infected false aneurysms in drug abusers. *ANZ J Surg*. 2005;75(11):1005-10. DOI <http://dx.doi.org/10.1111/j.1445-2197.2005.03578.x>
7. Sapkota R SS, Thapa B, Shrestha K R, Rajbhandari N, Shrestha U K. Management of Pseudoaneurysms in IV Drug Users. *Jiom*; December, 2011;33:3.
8. Saini NS, Luther A, Mahajan A, Joseph A. Infected pseudoaneurysms in intravenous drug abusers: Ligation or reconstruction? *Int J Appl Basic Med Res*. 2014;4(1):S23–S26. DOI <http://dx.doi.org/10.4103/2229-516x.140715>
9. Yegane RA, Salehi NA, GHaseminegad A, Bahrami F, Bashashati M, Ahmadi M et al. Surgical Approach to Vascular Complications of Intravenous Drug Abuse. *Eur J Vasc Endovasc Surg* (2006)32, 397-401. DOI <http://dx.doi.org/10.1016/j.jvs.2006.08.042>
10. Cheema MA, shafique A. Presentation and management of pseudoaneurysms of femoral artery. *J Coll Physicians Surg Pak*. 2005;15(3):162-4. DOI <http://dx.doi.org/03.2005/jcpsp.162164>
11. Qiu J, Zhou W, Zhou W, Tang X, Yuan Q, Zhu X et al. The treatment of infected femoral artery pseudoaneurysms secondary to drug abuse: 11 years of experience at a single institution. *Ann Vasc Surg*. 2016;36:35-43. DOI <http://dx.doi.org/10.1016/j.avsg.2016.03.030>
12. Peirce C, Coffey JC, O Grady H, Aly S, O'Malley K, O'Donohoe M. The management of mycotic femoral pseudoaneurysm in intravenous drug abusers. *Ann Vasc Surg*. 2009;23(3):345-9. DOI <http://dx.doi.org/10.1016/j.asvg.2008.08.013>
13. Lashkarizadeh MR, Ashrafanguie M, Ashrafanguie M. Surgical management of femoral artery pseudoaneurysms secondary to drug abuse. *J Coll Physicians Surg Pak*. 2011;21(11):672-5. Available from: <https://pdfs.semanticscholar.org/2adf/7aed19c1f42164c61f33eab936824a777625.pdf>
14. Jayaraman S, Richardson D, Conrad M, Eichler C, Schecter W. Mycotic pseudoaneurysms due to injection drug use: a ten-year experience. *Ann Vasc Surg*. 2012;26(6):819-24.

DOI <http://dx.doi.org/10.1016/j.avg.2011.11.031>

15. Salimi J, Shojaeefar A, Khashayar P. Management of infected femoral pseudoaneurysms in intravenous drug abusers: a review of 57 cases. Arch Med Res. 2008;39(1):120-4. DOI <http://dx.doi.org/10.1016/j.arcmed.2007.07.004>
16. Kotsikoris I, Papas TT, Papanas N, Tzor- Batzoglou I, Maras D, Bessias N et al. Femoral artery pseudoaneurysms in intravenous drug users: a 12-year series. Int Angiol. 2012;31(5):433-7. PMID [22990505](https://pubmed.ncbi.nlm.nih.gov/22990505/)